HAIR STYLING TOOL

Inventors: Christopher Peter Parker, Liverpool (GB); Vincenzo LoGiudice, Liverpool (GB)

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ABSTRACT

A hair styling tool comprises a central roller (12) having end pieces (14) disposed around the outside of the roller and in which the outside surface (16) of the roller between the end pieces (14) has one or more dividers to form two or more segments (18, 19) around the roller. In specific arrangements the roller is hollow and certain segments (19) have holes (30) through which hair treatment may be forced.
HAIR STYLING TOOL

[0001] The present invention relates to a hair styling tool. Although arising from the application of dye to selectively colour or highlight hair, the invention can be used to differentially apply bleach, perm lotion, conditioners and other treatments to part of the hair, while reducing the risk of the treatment straying to other portions of hair which are to remain untreated.

[0002] Applying coloured highlights to hair is a highly skilled and labour intensive task, typically taking between sixty and ninety minutes per client. Two methods are currently in common use.

[0003] The first method, commonly used in professional hair salons, requires the manual segregation of hair into areas to be coloured and areas not to be coloured followed by the manual application of dye while protecting the rest of the hair using, for example, aluminium foil. This method is time consuming, taking between sixty and ninety minutes per client, making it expensive; it can also produce uneven results as the hair treated first will be exposed to the dye for up to 90 minutes longer than the hair treated last. The segregation of hair into coloured and uncoloured portions and the subsequent application of dye is also a highly skilled task adding to the cost of the process.

[0004] The second method, more commonly used by amateurs utilises a close fitting cap, for example, made of latex pierced in numerous places with small holes through which the hair to be coloured can be pulled using a small hook. Both methods have a number of deficiencies. This method is also time consuming and can produce undesirable results due to the random nature of the colour distribution as it is not possible to select specific portions of hair to be coloured.

[0005] Various proposals have been put forward in an attempt to solve the problem of speed and skill required, but with only limited success. Devices described in U.S. Pat. Nos. 5,588,449 and 7,530,358 are complex with many moving parts giving only a modest improvement in speed and reduction in the skill required while introducing equipment that would be expensive and difficult to clean. The devices of U.S. Pat. Nos. 6,145,513 and 6,286,518, while improving the speed of operation but are limited in accuracy, only work effectively with viscous colouring products and expose the clients scalp to chemicals in the colouring process.

[0006] In this invention the expression "hair treatment" covers bleaches, dyes, perm lotions, conditioners and as well as other treatments. "Liquid hair treatments" are such treatments provided as a liquid, suspension in a liquid, or dissolved in a liquid. Viscosity is immaterial beyond a requirement that the liquid will flow in the devices described herein.

[0007] In this invention the expression "basic hair treatment" covers all of the types of hair treatment as described previously above in paragraph [0006] but where the chemical (s) or treatment is present in a substantially dry form such as powder, granule, tablet or other such composition including gases or vapour. "Basic hair treatments" are such treatments that substantially dry until a catalyst is added where it then intermixes with the "basic hair treatment" and creates a substance that can flow. Alternatively the "basic hair treatment" can be a combination of both "basic hair treatment and a catalyst" which are brought together but is maintained in an inert form until the introduction of a releasing agent such as a solvent, or oxygen or such other catalyst whereby the "hair treatment" then develops and is applied to the parts of the hair requiring the treatment in the usual way.

[0008] According to the present invention a hair styling tool has a roller characterized in that the roller has one or more dividers disposed around its external surface to form two or more segments around the roller, and in that the roller has holes along its length leading from the interior of the roller into one or more of the segments and that pressure applied to liquid hair treatment urges the liquid hair treatment through the holes from the interior of the roller into the one of more said segments.

[0009] The holes are aligned with the segments which will contain hair intended to be treated.

[0010] In a first embodiment such a hair styling tool is characterized in having an applicator to urge the liquid hair treatment through the holes from the interior of the roller into the one of more said segments.

[0011] Hair can be wound onto the roller between the dividers giving at least two separated portions of hair. The roller can be made of any resilient material, preferably a mouldable polymer such as nylon, polypropylene or polystyrene. The roller can be of any suitable dimension to wind hair onto, but preferably between 10 mm and 100 mm. Preferably the dividers are movable relative to the roller. Preferably the dividers are shaped so as to at least partially enclose the portion of hair between them. The dividers can be made of any suitable resilient material but preferably a mouldable polymer.

[0012] The roller would normally be cylindrical but there is no reason why it should not be of another section—triangular or square for example—if special effects are required. An applicator, comprising a plunger and reservoir could then be a corresponding shape to fit the roller.

[0013] Normally the dividers are disposed generally perpendicular to the axis of the roller. But in one arrangement the outer portion of the dividers are inclined at an angle to the perpendicular such as to partially protect a portion in a segment of hair from flow of liquid hair treatment from an adjacent segment.

[0014] The dividers 18 and 19 are generally equally spaced along the axis of the roller but there is no reason why they should not be unequally spaced or be of unequal depths depending if special effects are required. Additionally there is no reason why a roller cannot have a combination of different sections and shapes and alternate widths and depths to create variety of effects.

[0015] In one embodiment the applicator is a plunger operating within the hollow roller into a container to contain the treatment, the treatment is squeezed out of the container and through an open passage between the plunger and inner surface of the roller through the holes and onto any hair in the segments into which the holes are open.

[0016] In a preferred arrangement of the tool with a plunger, the holes connecting with segments towards the ends of the roller are larger than those holes connecting with segments at centre of the roller. The open passage between the plunger and the inner surface of the roller causes resistance to the flow of hair treatment, thus the hair treatment would tend preferentially to flow out of holes towards the middle of the roller. By increasing the size of the holes towards the ends of the rollers, resistance to flow is reduced, thus ensuring more even distribution of the hair treatment along the length of the roller.

[0017] In another embodiment the applicator is a container joined to the roller and said container having a plunger, wherein operation of the plunger causes hair treatment to flow
through the holes (30) and onto any hair in the segments (19) into which the holes are open. In this embodiment the holes can be equal size, as there is an unrestricted flow within the interior of the roller.

[0018] Normally the container would be a pressurised canister containing hair treatment, but in more general terms it can be any arrangement in which pressure is applied to hair treatment in the container to force it into the interior of the roller. The canister can be supplied as a separate unit or as part of the hair treatment tool itself.

[0019] In a preferred arrangement of an embodiment having a separate container in which pressure is applied to hair treatment—such as a pressurised canister—the roller is closed at both ends save for an aperture at one end which may be sealed against the outlet of the canister.

[0020] The attached figures contain examples of the invention and its use and show further features thereof.

[0021] FIG. 1 is a schematic side view illustrating its basic principles of the invention;

[0022] FIG. 2 is a schematic angled view showing basic principles of the invention;

[0023] FIG. 3 is a schematic side of a development of the invention showing revised dividers;

[0024] FIG. 4 is a schematic cross sectional view of a further development of the invention having a plunger;

[0025] FIG. 5 is a schematic cross sectional view of still development of invention;

[0026] FIG. 6 is an assembly view of a first embodiment of the invention showing the tool in an open position;

[0027] FIG. 7 is similar to FIG. 6 but with the tool closed;

[0028] FIG. 8 is an exploded view showing the components of the tool of FIG. 6;

[0029] FIG. 9 is vertical section on the line A-A' of FIG. 7;

[0030] FIGS. 10 to 13 show a second embodiment of the invention;

[0031] FIG. 10 shows a second embodiment of the invention and is an assembly view showing the tool illustrating the method of operation;

[0032] FIG. 11 is an assembly view showing the tool of FIG. 10 in an open position;

[0033] FIG. 12 is the same as FIG. 11 but with the tool in a closed position;

[0034] FIG. 13 is vertical section on the line B-B' of FIG. 12;

[0035] FIG. 14 is an exploded view of a third embodiment of the invention showing the components which include a shroud;

[0036] FIG. 15 is a half end on half side on perspective view of the assembled tool of FIG. 14;

[0037] FIG. 16 is a vertical section of the tool of FIG. 15;

[0038] FIG. 17 is a schematic exploded view of this embodiment, without a shroud, showing the use of a disposable reservoir;

[0039] FIG. 18 is a schematic exploded view of this embodiment, without the shroud, showing the use of a fixed plunger and refillable reservoir;

[0040] FIGS. 19 and 20 show a vertical section of a further development of the embodiment shown in FIGS. 14 to 18, with the plunger firstly in its initial position (FIG. 21) and secondly pushed fully home into the reservoir (FIG. 22);

[0041] FIG. 21 is a schematic view in partial section of an embodiment similar to that of FIGS. 21 and 22 showing the flow paths of hair treatment in the device;

[0042] FIGS. 22A to 22D show exploded views from different angles of the various components of the further development in FIGS. 21 and 22;

[0043] FIG. 23A shows a variation on the arrangement illustrated in FIGS. 19 to 22 using spacers to maintain a disposable reservoir in place when insert into the device, and to provide larger channels for the flow of hair treatments.

[0044] FIGS. 24A, 24B, 24C, and 24D show various containers for use with the invention;

[0045] FIG. 25 shows other reservoir/seal arrangements for use with the invention;

[0046] FIGS. 26A and 26B show the use of an embodiment with a pressurised canister containing the dye or hair treatment or a catalyst such as hydrogen peroxide or a mixture thereof;

[0047] FIGS. 27A to 27C show a further development of the invention using a segmented canister of the kind shown in FIG. 19D containing dye or other hair treatment and a catalyst such as hydrogen peroxide on the other side of the segregation;

[0048] FIG. 28 shows an exploded view of a segmented roller for use with the present invention.

[0049] The principles of the invention are described in FIGS. 1 to 5; practical embodiments are described and discussed with reference to FIGS. 6 to 28.

[0050] FIGS. 1, 2 and 3 show a simple hair styling tool. The tool comprises a cylindrical roller 12 onto which hair can be wound. The roller has external end pieces 14; the outside surface 16 of the roller is divided into segments 18 by dividers 22. Hair wound around the roller is contained in the segments 18. Hair treatment can be selectively applied to the hair wound into some segments and not others. The dividers 22 are disposed generally to be perpendicular to the axis 20 of the roller 12.

[0051] In FIG. 3, the outer portions 26 of dividers 22 and end pieces 14 are angled to the perpendicular disposition of the dividers and end pieces to the axis of the roller so as to at least partially enclose some of the portions of hair in the segments. In FIG. 3, six segments 18 are shown with pairs of end pieces/dividers, shown as 23 and 24, inclined in opposite directions to partially enclose of portions of hair in the segment 18 between them. The hair in the segments 19 not so protected will be treated with hair treatment.

[0052] Optionally the dividers 22 may be moveable in respect to the roller relative to its axis, this is illustrated, for example, FIG. 5 and in the particular embodiment described with reference to FIGS. 11 and 12.

[0053] In FIG. 4 the roller 12 is fitted with a reservoir 28 to contain a suitable liquid hair treatment and holes 30 leading from the interior to the exterior of the roller into particular segments 19. A plunger 32 is used to force liquid hair treatment from the reservoir 28 via the channel 34 formed between the reservoir 28 and the inner wall of the roller 12 through the holes 30 delivering the liquid treatment to portions of hair in the particular segments 19. Hair in other segments 18 is not exposed to the hair treatment. The reservoir 28 and plunger 32 between them comprise the applicator of the invention.

[0054] Optionally the plunger 32 may have an external screw thread 36 engaging a screw thread on the interior of the roller as shown in FIG. 5 the plunger may then be moved relative to the roller via a screw motion. The dividers 22 may be moved together to a closed position through the action of the screw motion used to operate the plunger 32, greatly improving speed and efficiency.
FGS. 6 to 9 show a first practical device following the principles of Figs. 3 and 4 (Fig. 6 shows the device in open position and Fig. 7 closed ready to commence application of a hair treatment). Liquid hair treatment can be injected to the area containing hair that requires treatment from a reservoir that has been filled by the user prior to assembly with dying solution. The tool 10 comprises a hollow cylindrical roller 12 onto which hair can be wound. The roller has external frusta-conical shaped semi-rigid end pieces 14, the end pieces being inclined towards each other. The outside surface 16 of the roller is divided into alternate segments 18 and 19 by flexible frusta-conical dividers 22. It will be seen that each flexible divider will have two stable positions, one where it is inclined towards a segment 18 and the other where it is inclined towards segment 19. When the roller is in its so-called open position the dividers are all inclined towards the segments 18.

[0056] Hair is wound onto roller 12 from the tip of the hair towards the root. The hair segregates itself between the dividers 22 into the segments 18 and 19. When this is done, the dividers 22 are flipped by hand to their other stable position, the closed position, enclosing or partially enclosing the hair in segments 19. Hair treatments can be selectively applied to the hair wound onto segments 19, but hair wound onto segments 18 would remain untreated. Pairs of end pieces/dividers, shown as 23 and 24, are inclined in opposite directions to cause partial enclosure of the portions of hair in segments 19. Roller 12 contains a reservoir 28 to contain a suitable liquid hair treatment and holes 30 leading from the interior to the exterior of the roller into segments 19. A plunger 32 faces the reservoir 28 and a channel 36 formed between the reservoir plunger 32, and the inner wall of the roller 12 through to holes 30 between the inside of roller 12 and segments 19. The dividers 22 prevent the hair treatment reaching hair in segments 18.

[0057] Minimal assembly is required during manufacture. The roller 12 in this embodiment is a tube moulded from a suitable plastic with several rubber/soft plastic end pieces 14 and dividers 22 that form the segments 18 and 19 when spaced along the axis of the roller 12. As is seen the shape and flexible material of the dividers 22 pieces allows them to be snapped in position in an alternate convex/concave pairs 23 and 24 (as shown in Fig. 7). In the closed position, 23 and 24 close substantially over the portion of hair to be treated, so that in use hair treatment flowing through the holes 30 is substantially contained within segment 19, hair in segments 18 contain segregated hair which is intentionally left untreated.

[0058] The stem 44 of plunger 32 and the outer wall of reservoir 28 is slightly to form the passage 36. The outer part 46 of the stem 44 is parallel sided and is a snug sliding fit within the roller 12; the snug fit prevents treatment escaping along the shaft of plunger 32. The outmost part 48 of reservoir 28 is a tight fit within roller 12 to prevent treatment escaping between the reservoir wall and the inside of roller 12. The reservoir has a cylindrical recess 50 opposite the head 40 of plunger 32 which in turn has longitudinal grooves 42 to allow hair treatment to flow past the plunger head into channel 36.

[0059] In use reservoir 28 with prepared liquid hair treatment is inserted into one end 38 of roller 12, plunger 32 is inserted in to the other end 39 of roller 12 (up to a marked position). The roller 12 thus assembled is used in the normal way to roll a chosen section of hair that is to be treated, the conical rubber dividers 22 are flipped in pairs 23 and 24 to form pockets around the divided hair in segments 19, other rollers 12 are used as required over the head of hair. The head 40 of the plunger 32 is pushed into the cylindrical recess 50 to force treatment out through the grooves 42 and passage 36 to holes 30, passing through the holes 30 onto hair in segments 19. The process is repeated with the other rollers in the hair. The rollers are left for the correct period of time as required for the treatment process to be completed before the rollers are removed.

[0060] In an alternative to the above the dividers are closed over segment 19 by hand. In one arrangement, the end pieces 14 are fixed but are conical and inclined towards each other. The dividers are conical and flexible as described above. Initially the conical dividers 22 are inclined towards segments 18, with segments 19 open as shown in Fig. 8. Hair is wound onto the roller 12 from the tip of the hair towards the root. The hair segregates itself between the dividers into segments 18 and 19 as before. As the roller is made of flexible material pushing the ends thereof towards each other will cause the roller to flex significantly in the area of segments 19, where it is weakened by the presence of holes 30. This flexing causes the dividers to flip to their other stable position, closing the hair in segments 23 and 24 as before.

[0061] Alternatively, rather than pushing the ends of the roller, the ends may be twisted with respect to each other. This causes the roller in its weakened portions 19 to flex forcing the flexible dividers to flip to their other stable position, partially or wholly enclosing the hair within segments 19. Counter twisting or pulling the ends would cause the flexible dividers to flip to their other stable position.

[0062] In a further alternative one divider 23, of each pair of dividers 23 and 24, is semi rigid and is inclined towards a segment 19. The other member 24 of the pair is flexible as before. In the open position the divider 24 is inclined towards segment 18. By twisting the roller, this divider 24 is flipped to its closed position inclined towards segment 19 and the other member 23 of its pair. In a similar design to those shown in Figs. 6 to 9, the plunger 32 is fixed within roller 12, and the reservoir 28 may be pushed towards it by a pushing or twisting motion so that the head 40 of the plunger (32) penetrates the cylindrical recess 50, forcing liquid hair treatment out through grooves 42 and passage 26 through holes 30 onto hair contained in the segments 19.

[0063] For some situations the embodiment of Figs. 6 to 9 has two potential drawbacks: firstly the permanent location of the dividers on the roller may cause cleaning difficulties in a reusable device; secondly operation of flipping the rubber conical side walls to close or partially close segments 19 may be fiddly for a home user who may not be able to see the roller properly.

[0064] A further development is shown in Figs. 10 to 13 which illustrate a tool 10 similar to that of Figs. 6 to 9. The end pieces 14 and dividers 22 are mounted on the external surface of roller 12 and may slide across it. The reservoir 28 and plunger shaft 32 have a plurality of screw tread-like grooves 52 on their exterior surfaces. The grooves are in pairs 53 and 54 along the length of the reservoir and plunger shaft with screw pitches of opposite handedness. The end pieces 14 and dividers 22 have internal lugs 56 passing through slots 58 in the wall of roller 12, into the grooves 52, such that the lug 56 on one divider 23 of a pair of an end wall 14 and divider 22 or two dividers 22 engages with groove 53 with a left hand pitch, and the other divider of the pair 24 with a groove 54 of right hand pitch. In this case, during assembly of the tool, the
plunger and reservoir will twist causing the lugs 56 to move along slots 58, moving the pairs of dividers 23 and 24 together closing off segments 19 and hair contained therein. As before the plunger is urged fully home into reservoir 28, discharging hair treatment along passage 36 through holes 30 onto hair in the segments 19. Hair in the other segments 18 is untouched. With this embodiment the user simply rolls their hair up on the roller 12, and then with the twisting action the roller isolates the hair into strips ready for an additional pushing action that delivers the hair treatment. The twisting action provides the movement of the end walls/dividers uses a screw thread type mechanism on the plunger and reservoir, both left and right handed to move the end walls/dividers equally towards the middle of segments 19. This screw mechanism also has a small section of flat where turning action is still applied by the user but without the corresponding movement of the side wall, will provide an element of locking that will prevent any back movement and so locking the mechanism in place.

[0065] The embodiment of FIGS. 10 to 13 has additional parts but can be completely stripped down for thorough cleaning. A low cost disposable version can be produced that would not require cleaning; such a version could also be sold with the reservoir 28 prefilled with hair treatment.

[0066] A further embodiment is shown in FIGS. 14 to 18. This embodiment provides a tool that is of lower cost to manufacture with fewer parts than the embodiment of FIGS. 10 to 13 and is very practical for use both by the professional and home user. It is easy to clean, an important feature of a reusable device.

[0067] The tool has a roller 12 which is a simple one piece moulding. Small hooks located on the outside of surface 16 of roller 12 improve hair grip.

[0068] The main components of this embodiment are the same as those shown in FIGS. 6 to 10. They are reservoir 28 with cylindrical recess 40 which can be pushed into one end 38 of roller 12, a plunger 32 with its head 40 having grooves 42 to engage into the cylindrical recess 40 to force hair treatment out along passage 36 through holes 30 into segments 19. However in contrast to the embodiments of FIGS. 6 to 13 the end pieces 14 and dividers 22 are rigid or semi rigid and disposed generally perpendicularly to the axis 20 of the roller 12. A hinged shroud 64 is arranged to fit around the roller 12, the shroud having grooves 66 around its surface to engage over the rims 68 of dividers 22. The shroud may be clamped in place around the roller with a butterfly clip type mechanism 70. The outer surface of segments 18 may be textured or lined with a gripping means 62 such as mini-hook fastenings, one common available type being the hook surface of Velcro®, to assist adhesion to the hair as the roller is wound onto the hair. The dividers 22 form a series of segment 18 and 19 around the roller 12, with the segments 19 having holes 30 through which hair treatment ejected from the cylindrical recess flows. Segments 18 have no connection to the inside of roller 12. Clamping shroud 64 around the roller 12 prevents hair treatment from passing from segments 19 into segments 18. The hinge of shroud 64 is sprung and is urged open by pressing the corresponding finger pieces 70 together. Ideally the shroud is made from a rigid transparent plastic such as a polycarbonate, or made a colour of aesthetic appeal; the roller and dividers moulding would be cast in a softer plastic such as polythene (this moulding could also be of rubber), the reservoir and plunger might also be cast in polystyrene.

[0069] In use the cylindrical recess 50 is filled to the correct level with prepared hair treatment and the reservoir 28 fitted into one end 38 of roller 12. The plunger 32 is inserted into the other end 39 of the roller 12 (up to a marked position) where it engages with the semi flexible lip 86 of the reservoir with the grooves 82 and 84 of the plunger thereby making a seal. Chosen sections of hair to be treated are rolled onto the roller which automatically segregates the hair between segments 18 and 19. Shroud 64 is fitted around the roller 12 to enclose the segregated hair between segments 18 and 19. Other similar rollers are inserted elsewhere in the hair. The reservoir 28 is pushed into the roller 12 and thereby forcing hair treatment out the reservoir 50 through holes 30 into segments 19 depositing treatment onto the hair in those segments. The roller(s) are left for the correct period of time as required for the hair treatment process to complete before removal of rollers.

[0070] In an alternative arrangement, in the embodiment shown in FIGS. 14 to 16, the plunger 32 is fixed, either as a moulding or otherwise, within the roller 12, towards one end 39. The reservoir 28 can be placed on a table with the cylindrical recess 50 facing upwards. The cylindrical recess 50 is then filled with the intended treatment. The end 38 of roller 12 is pushed over and around the reservoir, sealing the treatment within the roller 12. Hair is then wound onto the roller 12 by the user. When the roller has been wound to the desired position the shroud 64 is clamped around the roller. The user then pushes the reservoir 28 further into the roller 12, where the plunger 32 acts upon the interior of the recess 50, forcing hair treatment out of the cylindrical recess around the outside of reservoir 28 and plunger 32 through holes 30 onto hair contained within segments 19.

[0071] FIG. 17 is an exploded view of the tool of FIGS. 14 to 16 showing the use of a disposable reservoir. The main components shown are as described previously. They are: reservoir 28 with cylindrical recess 50 which can be pushed into one end 38 of roller 12; plunger 32 which can be pushed into the opposite end 39 of roller 12, the plunger’s head 40 having grooves 42; rigid dividers divide the outside of roller 12 into segments 18 and 19; and holes 30 through the roller provide a passage for liquid hair treatment from inside the roller to segments 19. The reservoir 28 may be disposable and may be supplied to the user as a sealed component with the hair treatment 52 sealed by seal 51 in cylindrical recess 50. The plunger has a portion 40 with grooves 42 along which the hair treatment travels when the plunger 40 enters chamber 50, past plunger stem 44 and a parallel sided end portion 46 as before. The cylindrical recess 50 has a semi flexible internal lip 86 around its inside upper edge, such that if the lip 86 and groove 82 are engaged the cylindrical recess 50 is shut off. Initially, the reservoir 28 is stood on end with cylindrical recess 50 upper-most. Seal 51 is removed and the tool 10 assembled by engaging the reservoir 28 partially into end 38 of the roller 12, and the plunger 32 partially into the other end 39, maintaining the roller upright. Reservoir 28 and plunger 32 are then pushed towards each other until semi flexible lip 86 and the groove 82 engages temporarily sealing the hair treatment in the cylindrical recess 50. Hair can now be wound around the roller, separating into segments 18 and 19 as previously described. The gripping means 62 helps maintain hair in position in the roller while shroud 64 (not shown in FIG. 17) is clamped in position around roller 12 and over end pieces 14 and dividers 22. Once the roller is clamped in position, the plunger 32 and reservoir 28 are pushed further together, so that hair treatment 52 in cylindrical recess 50 is
contact with grooves 42 and is forced out along the grooves 42 around the reservoir and plunger stem 44 as before, through holes 30 to contact hair in segments 19.

[0072] In FIG. 17 the disposable reservoir may be replaced by a refillable reservoir as described in FIG. 18 below.

[0073] FIG. 18 is a partially assembled view of the tool of FIGS. 14 to 16 showing the use of a reusable and refillable reservoir in alternative of a fixed plunger. The main components are: reservoir 28 with cylindrical recess 40 which can be pushed into one end 38 of roller 12; plunger 32 which is fixed in the opposite end 39 of roller 12. Rigid dividers divide the outside of roller 12 into segments 18 and 19; and holes 30 through the roller provide a passage for hair treatment from inside the roller to segments 19. The reservoir 28 is disposable and is supplied to the user as a sealed component with the hair treatment 52 sealed by seal 51 in cylindrical recess 50.

[0074] The plunger has a head 40 with grooves 42, stem 44 and parallel sided end portion 46 as before. However, in this case the parallel sided end portion 46 of plunger 32 is engaged within the end 39 of roller 12. The engagement may either be by semi-forced fitting so that the plunger can be removed for washing, or permanently by gluing it or friction welding it in place, or by designing the plunger and roller as a single moulding.

[0075] This arrangement can be used with a disposable reservoir as described in FIG. 17 or with a refillable reservoir as described below. In FIG. 18, the reservoir 28 has a cylindrical recess 50 to receive liquid hair treatment as before. The inner circumference of the cylindrical recess has a semi rigid lip 86, which will engage around a groove 82 at end of plunger head 40. The lip 86 is at the top inner circumference of the cylindrical recess when the reservoir is stood on end. A seal 51 may also be provided to seal the cylindrical recess by engaging lip 86 when the reservoir is not in use. In use, seal 51 is removed and if no or insufficient hair treatment is present, further treatment 52 may be added from a container 80.

[0076] Initially the reservoir 28 is stood on end with cylindrical recess 50 upper-most. If seal 51 is in place, it is removed and the tool 10 assembled by engaging the reservoir 28 partially into end 38 of the roller 12, so that groove 82 is engaged with lip 86 maintaining the roller upright. Hair can now be wound around the roller, separating into segments 18 and 19 as previously described. The gripping means 62 helps maintain hair in position on the roller while shroud 64 (not shown in FIG. 18) is clamped in position around roller 12 and over end pieces 14 and dividers 22. Once the roller is clamped in position the reservoir 28 is pushed further into end 38 of roller 12 such that hair treatment 52 in cylindrical recess 50 is contact with grooves 42 and is forced out along the grooves 42 around the reservoir and plunger stem 44 as before, through holes 30 to contact hair in segments 19.

[0077] The reservoir is described having a refillable cylindrical recess, but there is no reason why it should not be designed to receive a detachable container pre-filled with hair treatment with the plunger engaging against the container and squeezing out the contents. Perm lotion is particularly interesting in this context as it is an application that could easily be used in the roller and does not need premixing so could be contained in a cylindrical recess.

[0078] FIGS. 21 to 24 show a further development of the embodiment of FIGS. 14 to 18. The components are similar to those of FIGS. 14 to 18, and are not described again in detail. The reservoir 28 is a single disposable unit supplied prefilled with hair treatment and acts as a container. The reservoir 28 has a single wall and a larger capacity than described previously and the grooves of head 40 and stem 42 are proportionally larger to allow the increased quantity of dye or hair treatment within the reservoir to extrude easily when the plunger 32 is urged fully home. The reservoir 28 also has external bayonet lugs 102 close to its closed base 104, and a knurled handling ring 106 around the closed base 104. The knurled gripping ring enables the tool to be easily held and assembled with the reservoir full of hair treatment. Alternatively, rather than a bayonet fitting, the reservoir can be screwed or clipped into the end of the roller 12.

[0079] When the reservoir 28 is inserted into the open end 38 of the hollow roller 12, it is twisted to engage behind internal bayonet lugs close to open end 38 of the roller 12. When the plunger 32 is pushed into the reservoir 28, the reservoir cannot be pushed back off in the process. As alternatives the reservoir can also be held in place by other securing means such as clips, or interacting screw threads. With this modification handling is easier, as the knurled gripping ring is elevated off a surface, making gripping of it easier.

[0080] The head 40 of plunger 32 has a separable silicon type rubber piece 110, engaging a hexagonal boss 112 on the end plunger 32. The silicon rubber piece 110 acts, firstly, as a means of gripping on the inside the reservoir 28 to hold the head of the plunger in its initial position 114 within the reservoir (currently about 7 mm deep) and, secondly, the deformable surface of the head 40 encourages the last of the hair treatment out of the reservoir. The boss 112 is hollow allowing access to the inside of the roller 12, with the plunger if the rubber piece 110 is removed. At the shoulder of the rubber piece 110 between its lateral side and its head which in use faces the base 104 of the reservoir there are indents 118 (about 2 mm deep and wide) to efficiently facilitate the flow of hair treatment from reservoir 28 to the grooves 42. The indents 118 are aligned with grooves 42.

[0081] Holes 120 in boss 119 of plunger 32 towards the end of the stem 44 away from the head 40 allow excess hair treatment to escape through them and into the overflow chamber 116 inside plunger 32. This avoids hair treatment escaping out from the roller if the user has mistakenly over filled the reservoir with treatment and the segments containing the hair to be treated is now full and the user continues to exert excess pressure to the plunger.

[0082] As the silicon rubber piece 110 is removable, there is access for easy cleaning of any excess hair treatment that has escaped into the overflow chamber 116.

[0083] The end of the plunger opposite head 40 has a removable cover 121, which enables further access to the overflow chamber 116 for cleaning purposes.

[0084] When the plunger 32 is pushed fully into the reservoir 28 as shown in FIG. 20 and FIG. 21, a 2 mm gap 122 is left between end of the stem 44 of the plunger 32 to allow all of the contents of the reservoir to be expelled efficiently out of reservoir 28, and holes in boss 120 enable excess hair treatment to escape into the interior of the plunger therein. The transition between plunger head 42 and plunger stem 44 has a chamfer 128, to help maintain the gap 122, when the plunger is fully in. The reservoir

[0085] The outer and inner surfaces 140 and 142 of shroud 64 are now completely smooth and the inner surface 142 is lined with a rubber type material 144, to close off over the dividers 22 to form the annular segments 18 and 19.
In the arrangement shown in FIGS. 14 to 18, it is sometimes fiddly for a user to perfectly align the grooves of the shroud shown with the dividers 22 especially if the tool 10 was at the back of the head. The arrangement shown in FIGS. 21 to 24 avoids this problem. The shroud 64 is made up of two half cylindrical portions, 146 and 148 with a hinge 150 joining them long one corresponding edge of each of the half cylinders 146 and 148. A spring 152 urges the two halves of the shroud together. Finger pieces 154 are used to open the shroud 64 against the bias of the spring, release of the finger pieces allows the shroud to close around a portion of hair to be treated, enclosing it into and dividing it between annular segments 18 and 19.

Other variations that are possible include the coupling of the reservoir and plunger together, prior to assembly of the tool, and blocking off one end of the roller 12, so the reservoir/plunger assembly could be assembled into the roller as single item, after the roller was put into the hair and clipped in place. It is also possible for the plunger to have flat sides and the ends to be castellated to aid gripping of the silicon type rubber piece on the end of the plunger and to aid hair treatment flow past to surface of plunger 32, however, this embodiment requires alignment of the plunger with the roller and can reduce the capacity of the reservoir and the reservoir or the roller has to be bigger to compensate.

Operation of the device can be seen more clearly in FIG. 23A. As plunger 32 is pushed into reservoir 28, hair treatment in reservoir 28 is extruded out along indent 118 in the silicon rubber piece 110 and into grooves 42. From here it is forced into holes 30 in the roller 12 and on into segments 19, where hair to be coloured or treated has been engaged between dividers 22, the roller 12 and shroud 64. As flow is easier into segment 19A, this will naturally fill first, followed in turn by segments 19B, 19C and finally 19D. After segments 19 are filled, any excess hair treatment will be forced along the outside of stem 44 to boss 119 into holes 120 and into overflow chamber 116 inside plunger 32. The arrangement between stem 44 and head 42 can be seen more clearly in FIG. 23A. The reservoir end 133 of stem is of sufficient diameter to engage against the lip 86 of reservoir 28. However there is a chamfer 128 between the end 133 and the main diameter of the stem 44 so that when the plunger is fully home a gap 122 of about 2mm is maintained around the outside of the stem 44 adjacent the head, to enable all the hair treatment to be expelled efficiently and for any excess hair treatment to gather and flow past the stem into the holes 120.

The holes 30C and 30D in the roller that correspond with segments 19C and 19D are of a larger size than the holes corresponding with the holes 30A and 30B corresponding with segments 19A and 19B. The larger holes 30C and 30D allow the hair treatment to enter segments 19C and 19D more easily while the slightly constricting holes 30A and 30B leading to segments 19A and 19D. So when segments 19A and 19B are full the remaining hair treatment will quickly enter segments 19C and 19D. Only once all the chambers are full will any excess hair treatment flow towards the boss 122 with the small holes 120 around its circumference, and the dye travels through the holes 120 in the boss into the internal overflow chamber 116.

Stem 44 has raised portions 123 which distribute the treatment evenly around the inside of the roller and prevent it gravitating towards the bottom of the roller.

In a further embodiment, not shown, the plunger head 40 has one or more flat sides, or indeed, is hexagonal in cross section. The inside of the reservoir would be correspondingly shaped. Castellations may be provided around the lip 86 of the reservoir which nest with corresponding castellations at the transition between the head 40 and stem 44. Such an arrangement may help to align the longitudinal grooves 42 with those on the head 118 and accordingly with corresponding outlets in the reservoir, but is more difficult to set up.

In FIG. 23A an arrangement similar to that shown in FIGS. 19 to 22 is illustrated in section. In this case the roller 12 has an open end 38, as before into which a reservoir 28 may be inserted opposite a closed and slightly domed end 206 at the other end of the roller. This embodiment employs spacers 203 to keep the reservoir 28 central within the roller to maintain an equal channel between the reservoir 28 and the interior of the roller 12 allowing the flow of hair dye or treatment around the side of the reservoir 28 into the holes 30. The spacers 203 are placed around the inner circumference of the roller, distributed evenly in rings between each set of holes 30, to hold a close ended reservoir 28 inserted into the roller in place substantially centrally in the roller, to provide a relatively wide channel 207 and 208 between the roller and the wall of the reservoir. Further spacers, again in the form of plastic spikes extend from the domed end of the roller 12 to abut the reservoir 28 maintaining the open channel leading to 207 and 208. In FIG. 23B an arrangement similar to that shown 23A is illustrated in section. A nozzle 204 which is casted allows the dye or hair treatment out of the reservoir and into the passages 207 and 208. FIG. 23C is an alternative arrangement with holes 205 (as shown) extend around the side of the reservoir close to its end 104. FIG. 23C does not have a domed end on the roller 12 and the reservoir 28 can abut the end of the roller 12. As before the assembly has a shroud 64 around the outside of dividers 22 to form the segments 19 containing hair to be treated. The holes 30 themselves are smaller (30A) close to the closed end 206 of the roller 12, increasing in size through the intermediate holes 30B and 30C, to the largest holes 30D furthest away from the end 206 the roller, and the slots 205 through which hair dye is extruded. This helps to ensure even distribution of the hair treatment to the segments 19.

Operation of the device shown in FIG. 23 is similar to that of FIG. 21. As plunger 32 is pushed into reservoir 28, hair treatment in reservoir 28 is extruded out from the slots 205. From here it is passes into channels 207 and through holes 30 in the roller 12 and on into segments 19, where hair to be coloured or treated has been engaged between dividers 22, the roller 12 and shroud 64. After all the segments 19 are filled, any excess hair treatment will be forced along the outside of plunger 32 into holes 120 and so into the overflow chamber 112 inside reservoir between the void of the plunger 32 and interior of the reservoir 28.

In FIGS. 24A, 24B and 24C various containers containing hair treatment for use in the invention are shown. Each of the containers is designed to fit snugly into the cylindrical recess 50 in reservoir 28.

In FIG. 24A, the container 90 has an opening lid 92. The container can be filled with hair treatment by the user. In use, the filled container 90 is sealed by closing lid 92 and placed within the cylindrical recess 50 in reservoir 28 (as discussed). When the reservoir is urged towards the plunger 32, the plunger head 40 deforms lid 92 inwards releasing the hair treatment to reach hair as described above.
[0096] In FIG. 24F, the container 94 has a fixed but breakable lid 96. The container is supplied prefilled with hair treatment. In use, the container 94 is placed within the cylindrical recess 50 in reservoir 28 (as discussed). When the reservoir is urged towards the plunger 32, the plunger head 40 deforms and breaks the lid 96 releasing the hair treatment to reach hair as described above.

[0097] In FIG. 24D, the container 98 has deformable breakable walls 99 but a hard lid 100. The container is supplied prefilled with hair treatment. In use, the container 94 is placed within the cylindrical recess 50 in reservoir 28 (as discussed). When the reservoir is urged towards the plunger 32, the plunger head 40 pushes on lid 100 deforming and braking walls 99 and releasing the hair treatment to reach hair as described above.

[0098] FIG. 25 shows a reservoir 28 similar to that shown in FIGS. 17 and 18 but which is supplied as a single disposable unit, replacing the separate container to be placed in a reservoir. The reservoir has a cylindrical recess 50 with an inner circumferential lip 86 at its open end. In this case however the seal 51 is deformable and sits within the recess 52 in position beneath lip 86 atop the hair treatment 52. The seal can be made of plastic coated cardboard, a plastic material, a metal foil, or a coated metal foil (to avoid a chemical reaction as would happen with chemicals such as perm lotion) or rubber. It is deformed and pushed into the recess 50 under the action of the plunger head 40 when the reservoir 28 is urged towards the plunger head as described previously releasing the hair treatment to pass around the outside of the plunger and reservoir into holes 30 onto hair contained in the segments 19. In this arrangement the reservoir can be supplied pre-sealed or could be reusable with the user applying the seal to the top of the reservoir recess once the reservoir recess 50 has been charged with the required hair treatment. Alternatively the seal can be placed in the end 38 of the roller 12; in this case, the act of pushing the reservoir into the end 38 temporarily pushes the seal 51 into the top of recess 50 seating in the hair treatment stopping any potential leakage. Further pushing of the reservoir towards the plunger causes the plunger head 40 to push on the seal 51, either breaking the seal or forcing it in to the recess 50. The hair treatment is released as before.

[0099] In the examples shown above, basic hair treatment material can also be in the form of a powder, granule, gel, a tablet or the like contained within a dissolvable capsule or in a dissolvable container such as for example, as shown in FIGS. 24A to 24D or with a dissolvable lid, such as in FIG. 25 or such as shown in FIG. 17, or a dissolvable seal 51. Such basic hair treatment may also be contained in the reservoir or within the roller administered from an inlet. Alternatively, it may be brought together with the catalyst being introduced under pressure such as in FIGS. 26A, 26B and 26D. As a further alternative the hair treatment may be in a divided container as shown in FIG. 24D, with the hair treatment, such as dye, on one side of a divider 101, and a reactant such as hydrogen peroxide in the other; the use of a container of this kind is described further with reference to FIGS. 27A to 27C below.

[0100] The basic hair treatment and a catalyst can also be together in an inert dry or suspended form, and then the reaction between the catalyst and the basic hair treatment material creates effervescence and due to the reaction between the basic hair treatment material and the catalyst. The hair treatment would come bubbling out the reservoir or from within the roller and the treatment would make its way out of the holes 30 of the roller and into the segments 19 of the roller 12 into the hair to be dyed or otherwise treated. The hair treatment would be contained within the segments 19 by a shroud 64, for example of the kind shown in FIG. 16 for the prescribed time while the dyeing or other treatment process takes place.

[0101] Containers, for example, as shown in FIGS. 24A to 24D or 25 can contain a powder, tablet, granules, pigment, suspension or other chemicals and treatments in the form of a combination of both basic hair treatment and catalyst in an inert form. In this way different shades of colour or different strengths of hair treatments can be put into the pre-filled containers, cartridges and the treatment is activated within the container or reservoir or within the roller with its respective catalyst introduced into the roller to create the catalytic action and the process is developed within the tool and applied to the parts of the hair requiring the treatment in the usual way.

[0102] FIGS. 26A and 26B show a yet further embodiment of the invention. In these figures a tool 160 according to the invention is being used to treat the hair of. The tool itself comprises a roller 12 and shroud 64, the latter being substantially as described with reference to FIG. 24D. The roller 12 has a hollow interior 182 which is closed at one end 164; the other end 166 has an open apertures 167. A stepped cylindrical receiver 162 may be inserted into the open end 166. One end 168 of the receiver 162 is substantially closed save for aperture 167 into the interior 182 of the roller 12, the other end 170 is open but the opening is secured by a gripping or securing means or such as that shown gripping teeth 172. A step 174 in the external diameter of the cylindrical receiver enables the step to sit against an internal flange 176 of the roller 12 close to the open end 166.

[0103] The receiver has external bayonet lugs 178, and a knurled handling ring 180. The external bayonet lugs 178 co-operate with corresponding bayonet lugs 184 inside the rim of the open end 166 of roller 12.

[0104] The applicator 186, which may be a container to which pressure is applied or a pressurised aerosol canister, containing hair treatment, is inserted into the end 170 of the applicator 162. The applicator 186 has raised external cylindrical portion 188 to fit inside a spring 194, a nozzle 190 at one end and a plunger at the other end. The external diameter of the nozzle 190 is chosen such that it fits inside the aperture 167, when the applicator 186 is pushed home into the receiver 166. The shoulder of nozzle 186 of the applicator 186 abuts the end 168 of the receiver, with the nozzle 190 protruding through aperture 167. The teeth 172 surround the plunger 192 and prevent it from sliding out of the receiver. The one end of spring 194 rests against the underside of plunger 192 and the other against the end of the receiver 166. Pressing the plunger 192 releases the hair treatment through nozzle 167 into the interior 182 of roller 12. Under pressure generated from the applicator 186, the hair treatment passes from the interior 182 through holes 30 in the roller into segments 19, as before, where it encounters hair contained in the segments 19 by the shroud 64. When sufficient hair treatment has reached the hair, or the applicator 186 has discharged, the plunger 192 is released, the spring 194 returns the plunger to its un-depressed position and the applicator 186 is closed.

[0105] As an alternative to the use of a pressurised canister, applicator 186 shown in the examples shown in FIGS. 26A and 26B contain a catalyst, which when discharged into the interior of the roller 12 mixes with a dye or hair treatment inside the roller and causes an effervescent or foaming action causing the basic treatment to pass through the holes 30 as
before. The basic hair treatment can also be in a more solid form of a powder or granule or a tablet as well as a semi-liquid form such as a gel or suspension or colloid.

[0106] As a further alternative the applicator 186 may contain the hair treatment and catalyst or solvent separately, alternatively they can be sealed within a segregated container such as shown in FIG. 19D; additionally, containers 19A, 19B, and 19C can be adapted to be made of a dissolvable material and have segregation as shown 19D. The solvent dissolves the container and allows the contents to intermix whereby the hair treatment travels along the grooves in the normal way or by foaming into the interior 182 of the roller and then through holes 30.

[0107] FIGS. 27A and 27B show yet a further embodiment of the invention where the canister has two nozzles 199, 200 each leading to a separate chamber 195 and 198 within the canister 186, via tubes 197. The chambers are isolated from one another by a divider 201 to prevent premature intermixing of the chemicals.

[0108] In this latter arrangement, for example, hydrogen peroxide and hair-colour are sealed in a pressurised canister 186 but kept separate from one another by divider 201. The sealing excludes oxygen to prevent oxidation. When the hydrogen peroxide and hair dye are expelled from the canister 186 through nozzles 199 and 200 they would become intermixed and react within the roller 12 as described previously in relation to FIGS. 26A and 26B, the foaming hair dye would be forced through holes in the roller 12 to be applied to the parts of the hair requiring the treatment as previously described.

[0109] Alternatively a flexible canister utilising a similar arrangement could be used and the canister can be deformed by the user to create the pressure to expel the contents.

[0110] If a surfactant and a dye were mixed together in a pressurised canister but to prevent oxidation of the dye by a catalyst such as hydrogen peroxide, they are kept separate by means of a barrier 201 while the surfactant would create a foaming action, the mixture of the catalyst and dye would activate the dye as it was being expelled from the can in unison. A stabiliser to stabilise the hair-colour and hydrogen peroxide would need to be added, examples are STAC (Stearyltrimethylammonium chloride) and Cetanol (Cetostearyl alcohol), which are resistant to oxidation of hydrogen peroxide. To enhance foaming performance, a surfactant such as AGS (Sodium Acylglutamate) is used as the foaming agent as it is resistant to antifoaming properties of salt and solvent.

[0111] In the embodiment in FIGS. 26A and 26B there is a single nozzle leading from a single chamber canister. In FIGS. 27A and 27B there are twin nozzles leading from two separate chambers within a canister so constructed. There is no reason why there cannot be three or more compartments arranged with three or more nozzles if it was necessary for a particular treatment or dying process.

[0112] Alternatively, as shown in FIG. 27C, with a union 202 more than one compartment within a canister can lead to a single nozzle 190 by interconnection of the tubes 197. This arrangement would greatly assist the intermixing of the chemicals as they were being brought together under pressure and expelled through the same nozzle 196.

[0113] Although FIGS. 26A, 26B, 26C show a single a nozzle with a single chamber within the canister, and 27A, 27B, 27C have twin nozzles and twin chamber arrangements 195 and 198, there is no reason there cannot be three or more compartments in a similar arrangement within a canister to expel the contents of different chambers out a single nozzle as shown in FIG. 27C.

[0114] Although FIGS. 26A and 26B show a single a nozzle with a single chamber within the canister, and 27A, 27B and 27C have twin nozzles and twin chamber arrangements 195 and 198, there is no reason there cannot be three or more compartments in a similar arrangement within a canister to expel the contents of different chambers out a single nozzle as shown in FIG. 27C.

[0115] The roller 12 need not be of fixed length. In FIG. 28 a segmented roller 12 is shown. It comprises a number of individual cylindrical segments 212 and 214. The segments each have a divider 22 at one edge and a stepped recessed portion 216 at their other edge, the recessed portion 216 to engage the inside of the adjacent segment. Alternate segments 212 have holes 30 and the other segments 214 do not have holes. In this way a roller of the kind shown in FIG. 23 can be assembled.

[0116] The use of canisters of the kind shown in FIGS. 26 and 27, in particular suitable for use with rollers constructed from segments as shown in FIG. 28, as this enables to roller structure and treatment arrangements to be very fine tuned to deal with both large portions of hair or small portions.

1-59. (canceled)

60. A hair styling tool having a roller comprising one or more circumferential dividers (22) disposed in pairs (23, 24) around its external surface to form two or more circumferential segments (18, 19) around the roller, and in that the roller has holes (30) along its length leading from the interior of the roller into one or more of the segments (19) formed between each member of a pair of dividers (23, 24), but not into segments (18) between one pair of dividers and the next pair of dividers and said roller additionally has an applicator to urge the liquid hair treatment through the holes from the interior of the roller into the one of more said segments (19) formed between each of a pair of dividers (23, 24).

61. A hair styling tool according to claim 60 wherein the segments (19) formed between each of a pair of dividers (23, 24) has a closing means to prevent hair treatment leaving said segment (19) to reach hair not to be exposed to treatment, said closing means comprising a plasp fitted around the periphery of the dividers (22).

62. A hair styling tool according to claim 60 wherein segments (19) formed between each of a pair of dividers (23, 24) has a closing means to prevent hair treatment leaving said segment (19) to reach hair not to be exposed to treatment, said closing means comprising a plasp fitted around the periphery of the dividers (22).

63. A hair styling tool according to claim 60 wherein the dividers (22) being flexible and frusto-conically shaped, and capable of being flipped to close said segments (19).

64. A hair styling tool according to claim 60 wherein A hair styling tool according to claim 60 characterised in that the applicator comprises a co-operating plunger (32) and reservoir (28) mounted in the roller wherein interaction between the plunger (32) and reservoir (28) urges any hair treatment
liquid in the reservoir (28) out of the reservoir through the holes (30), optionally plunger 32 has a chamber to receive to receive excess hair treatment.

65. A hair styling tool according to claim 64 wherein the plunger has a head with grooves (42) providing a passage for hair treatment from the reservoir (28) around the plunger (32).

66. A hair styling tool according to claim 64 additionally comprising a passage (36) formed between the walls of the reservoir (28) and plunger (32) and the holes (30).

67. A hair styling tool according to claim 60 wherein the applicator comprises a deformable container to be deformed by a user to expel the contents into the interior of the roller.

68. A hair styling tool according to claim 67 wherein the container comprises at least two chambers (195, 198) containing hair treatment in one chamber and catalyst the other chamber.

69. A hair styling tool according to claim 64 wherein the head (40) of the plunger has a ring (82), which may engage with the inner circumference (86) of a cylindrical recess (50) of the reservoir (28), temporarily to seal any hair treatment (52) within the cylindrical recess while a user's hair is wound onto the roller (12).

70. A hair styling tool according to claim 60 wherein the applicator comprises a container receivable into a recess (50) said recess (50) having an open end which is receivable into the roller (12) and a plunger to force hair treatment from the container through the holes (30).

71. A hair styling tool according to claim 60 in which the applicator comprises a co-operating plunger (32) and reservoir (28) characterized in that the reservoir has a recess containing hair treatment with a lid (51) said lid being deformable or breakable under action of the plunger to release hair treatment from the container.

72. A hair styling tool according to claim 60 in which in which the applicator comprises a co-operating plunger and a detachable reservoir, in which the outer surface of the reservoir and the inner surface of the roller (12) have mutual engagement means to retain the reservoir in position with respect to the roller (12) when the tool is assembled.

73. A hair styling tool according to claim 60 in which the applicator comprises a co-operating plunger (32) and reservoir (28) and in which the roller has internal spacers to hold the reservoir (28) in position within the roller (12) when the reservoir (28) is placed in the roller and, said spacers forming a channel (206) between the reservoir and the holes (30).

74. A hair styling tool according to claim 73 wherein the roller has a closed end (206) and an open end (38), the reservoir (28) being inserted in the open end.

75. A hair styling tool according to claim 64 in which the plunger (32) and reservoir (28) are mounted in the roller (12) and in which the holes connecting with segments away from the reservoir are larger than those holes connecting with segments closer to the reservoir.

76. A hair styling tool according to claim 60 in which the hair treatment and a catalyst are provided in the applicator and in which a chemical reaction between a catalyst and basic hair treatment forces hair treatment causing foaming or effervescence urging hair treatment through the holes (30) from the interior of the roller into the one of more said segments (19).

a. A hair styling tool having a roller comprising

b. one or more circumferential dividers (22) disposed in pairs (23, 24) around its external surface to form two or more circumferential segments (18, 19) around the roller, and in that the roller has holes (30) along its length leading from the interior of the roller into one or more of the segments (19) formed between each member of a pair of dividers (23, 24), but not into segments (18) between one pair of dividers and the next pair of dividers and said roller additionally has an applicator to urge the liquid hair treatment through the holes from the interior of the roller into the one of more said segments (19) formed between each of a pair of dividers (23, 24); and

c. a closing means to prevent hair treatment leaving said segment (19) to reach hair not to be exposed to treatment, said closing means comprising a clamp fitted around the periphery of the dividers (22).

77. A hair styling tool according to claim 76 in which the hair treatment and a catalyst are provided in the applicator and in which a chemical reaction between a catalyst and basic hair treatment forces hair treatment causing foaming or effervescence urging hair treatment through the holes (30) from the interior of the roller into the one of more said segments (19).

78. A hair styling tool according to claim 76 in which the applicator comprises a co-operating a plunger (32) and a reservoir (28), the reservoir having a recess containing hair treatment with a lid (51) said lid being deformable or breakable under action of the plunger to release hair treatment from the container.

79. A hair styling tool according to claim 76 wherein the applicator comprises a container receivable into a recess (50) said recess (50) having an open end which is receivable into the roller (12), and a plunger to force hair treatment from the container through the holes (30).

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